ANNEX 4. Analysis of profit indicators calculated from national accounts

Introduction

Inflation in Lithuania and its fluctuations are determined substantially by external factors — trends in international food and energy commodities markets. This dependence is related to high volatility of commodity prices and a significant share of food and energy goods in the basket of Lithuanian consumers, which is substantially larger than the euro area average.

Domestic factors also have a significant impact on inflation. Sometimes their impact is of the same direction as that of external factors, sometimes it is opposite. For example, during the economic upturn inflation was increased both by the prices dependent on external factors (food, fuel and administered prices grew due to a rapid increase in global commodity prices) and by the prices that are more related to domestic factors, which cover industrial goods and market services (core inflation, which reflects the growth of these prices, exceeded 6% in 2008). Contrary to the economic upturn period, now the prices dependent on the external situation and those dependent on the domestic situation have an opposite effect on inflation: prices related to commodity markets fall, whereas prices more related to the domestic situation rise consistently.

Inflationary pressure related to domestic factors can be estimated by using national accounts data. A significant indicator which allows evaluating this pressure is the GDP deflator. It is the ratio of nominal GDP (value of goods produced) to real GDP (volume of goods produced); therefore, we can say that it reflects the price of a unit of production. It can be broken down into labour costs, profits and taxes — domestic factors that determine price changes. After the breakdown of the GDP deflator and its changes into these components, we can see which domestic factors have a larger effect and which have a smaller effect.

With regard to domestic pressure on prices, it is common to pay most attention to the development of unit labour costs. They are projected according to the labour market situation and the situation of the whole economy. Less attention is paid to profit, which is analysed and modelled as a residual value obtained by subtracting labour costs from income. However, profit indicators are important as well. Their development reflects the capacity of enterprises to change the prices of goods produced and services provided when costs change; therefore, they are very closely related to the market situation. For example, if labour costs change when production demand is high, enterprises may raise production prices and thus maintain the profit earned or even earn higher profit. If labour costs increase when the economy is in downturn (for example, due to the minimum wage increase), possibilities for enterprises to transfer this increase to consumer prices are limited and they need to cover the increase in costs from their profit.

The logic and formulas of the GDP deflator breakdown

When breaking down the GDP deflator into components, national accounts data are used, specifically — real GDP and components of nominal GDP calculated using the income approach.[28] These components are income of various kinds, such as compensation of employees, gross operating surplus and mixed income, as well as taxes:

$$P \times Y = WIN + GOS + TAXN,$$

where: $P \times Y$ — nominal GDP (P — GDP deflator, Y — GDP volume or real GDP), WIN — nominal compensation of employees, GOS — gross operating surplus and mixed income, $TAXN$ —taxes (more precisely, difference of taxes, applied to production and imports, as well as subsidies). The indicator of gross operating surplus and mixed income is considered to be the measure most similar to profit, which can be obtained from national accounts, thus thereafter it will be called profit.

By dividing both sides of the presented identity from the GDP volume, unit (i.e. the production unit) indicators are obtained. Thus, the price of the GDP unit (GDP deflator) is the sum of unit labour costs (ULC), unit profits ($UGOS$) and unit taxes ($UTAXN$):

$$P = WIN/Y + GOS/Y + TAXN/Y = ULC + UGOS + UTAXN.$$

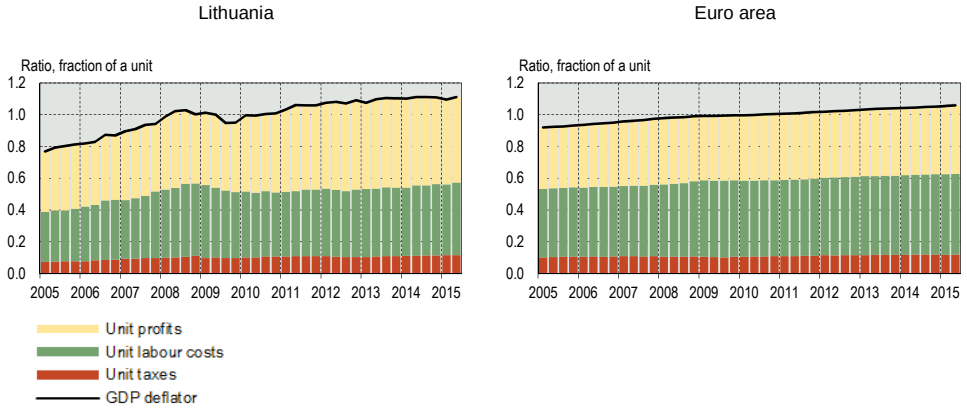
Since the GDP deflator may be broken down into unit components, its change may be explained by the changes of these components.

Trends of unit components of the GDP deflator

The GDP deflator breakdown according to the data of Lithuania and the euro area is presented in Chart A. The chart shows how the deflator level (2010 = 1) is changing and its distribution by components. It is obvious that the euro area GDP deflator and its structure were more stable: the deflator increased consistently and the distribution of its components remained broadly unchanged. As it is common in emerging market economies, wider fluctuations were characteristic to Lithuania: the deflator increased faster during the economic upturn, declined during the recession and the distribution of its components changed. The GDP deflator of Lithuania has a slightly different structure: unit profits comprise its largest part, whereas the largest part in the euro area consists of unit labour costs.

[28] Seasonally and working day adjusted quarterly data are used.

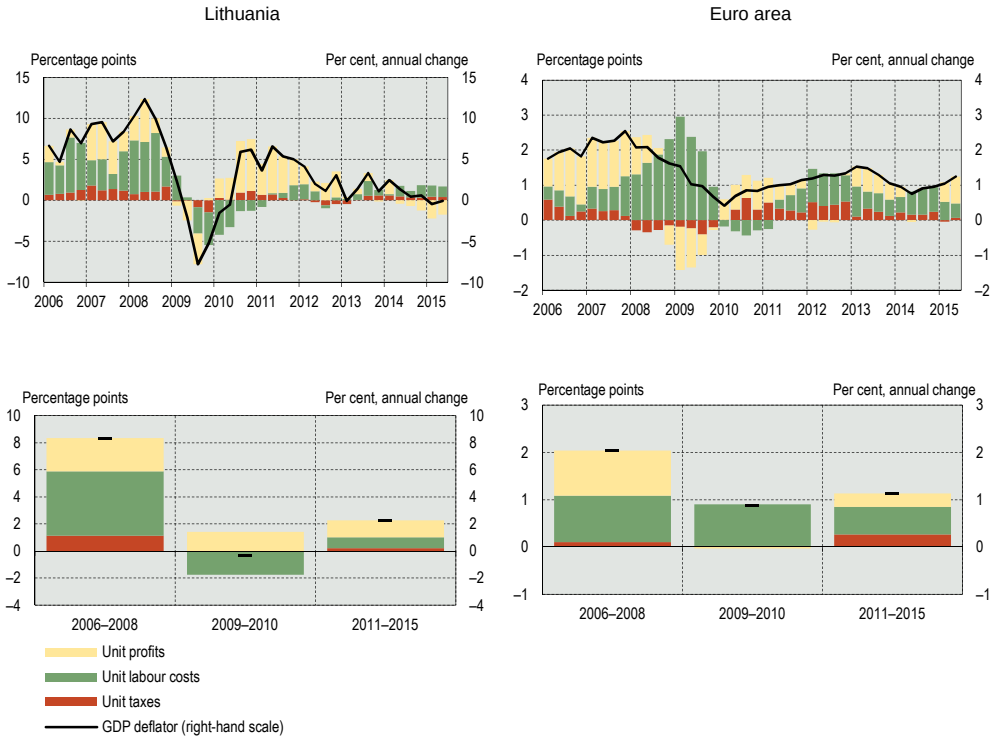
Chart A. GDP deflator factors in Lithuania and in the euro area
(ratio of components of nominal GDP, calculated using the income approach, to real GDP)



Sources: Eurostat and Bank of Lithuania calculations.

The components that determined the annual change of the GDP deflator in each quarter and the three periods used[29] are presented in Chart B. The chart shows not only higher volatility of the GDP deflator in Lithuania than in the euro area, but also the fact that GDP deflator changes in Lithuania and the euro area were determined by different factors.

Chart B. Contributions to GDP deflator changes in Lithuania and the euro area



Sources: Eurostat and Bank of Lithuania calculations.

In the period from 2006–2008, unit labour costs had a similar effect as unit profits in the euro area, whereas in Lithuania their effect was noticeably stronger. Wages grew very fast in our country. Their growth was supported by the bargaining power of employees, which increased due to the labour force shortage. Thus, compensation of employees grew considerably more than real GDP and the ratio of these indicators — unit labour costs — grew rapidly as well. The circumstances were favourable for the profit to grow during the economic upturn both in Lithuania and in the euro area: after the rise in labour costs and in the presence of strong production demand, enterprises could not only maintain the profit earned by transferring higher costs to production prices, but also increase it by raising prices more.

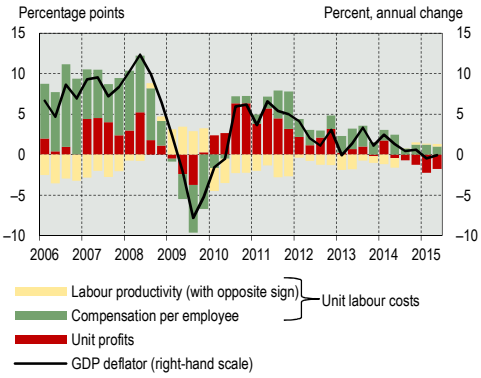
In 2009, the euro area GDP deflator continued to increase, supported by the growth of labour costs. It was supported by labour productivity changes. When real GDP declined, enterprises did not rush to reduce the number of employees;

[29] The periods approximately coincide with pre-crisis, crisis and post-crisis periods. Such coincidence is conditional, since the economic recession in Lithuania and the euro area started and ended at different times; besides, the euro area also suffered the second recession (from the second half of 2011 to the beginning of 2013), which was not observed in Lithuania.

therefore, productivity — the ratio of real GDP to the number of employees — declined. Still, the growth of the GDP deflator decelerated, since the contribution of unit profits became negative. Unit profits acted as a buffer: they slowed down the price growth when labour costs were rising. Such effect was also present during the second recession in the euro area: the contribution of unit profits was negative again in 2012 and slowed down the accelerated growth of the GDP deflator.

As in the euro area, the impact of unit profits in Lithuania in 2009 was negative. However, a more important factor of the decline of the GDP deflator was unit labour costs. Although labour productivity declined, as in the euro area, the upward effect of such change on unit labour costs was offset by a large decline of wages (see Chart C). Summarising the factors of the GDP deflator change in 2009 and 2010, it could be said that price adjustment in the euro area was more related to unit profits, whereas in Lithuania — to the trends of unit labour costs, more specifically the fall in wages.

Chart C. More detailed breakdown of GDP deflator changes in Lithuania



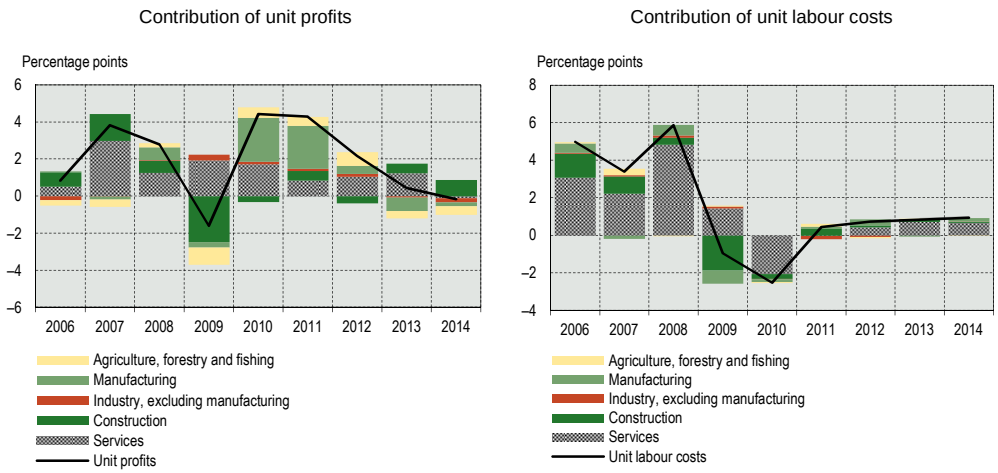
Sources: Statistics Lithuania and Bank of Lithuania calculations.
Note: for the sake of simplicity, the contribution of unit taxes is not shown.

In the period from 2011, which also includes the second recession in the euro area, the contribution of labour costs to the change of the GDP deflator declined, the impact of profits was moderate and both were considerably lower than in the period of 2006–2008. The impact of taxes increased, supported by fiscal consolidation measures and increasing production prices.

Since 2011, economic growth has become more sustainable in Lithuania. The GDP deflator has been growing much more slowly than before the crisis, since the contribution of both unit labour costs and unit profits has declined. In different years of the post-crisis period the contribution of unit profits differed considerably: it was high and positive during the recovery, later it declined and currently it is negative. The latter trend is new. The last time the contribution of profits was negative was in 2009, in the middle of the crisis. Currently profits perform the above-mentioned role of the buffer in Lithuania: owing to the lack of possibilities to raise prices (e.g. due to the environment of low inflation) and the increase in labour costs (related to the shortage of the labour force of suitable qualification and to the minimum wage increase), enterprises are forced to accept lower profits.

It is possible to perform even more detailed analysis of unit profits and unit labour costs in Lithuania by breaking down the contribution of these indicators to the GDP deflator changes by economic activity. To ensure that the trends are more obvious, quarterly data are aggregated to annual (see Chart D).

Chart D. Breakdown of contributions to the annual change of the GDP deflator by economic activity



Sources: Statistics Lithuania and Bank of Lithuania calculations.
Note: the difference between other taxes on production and other subsidies on production is not shown.

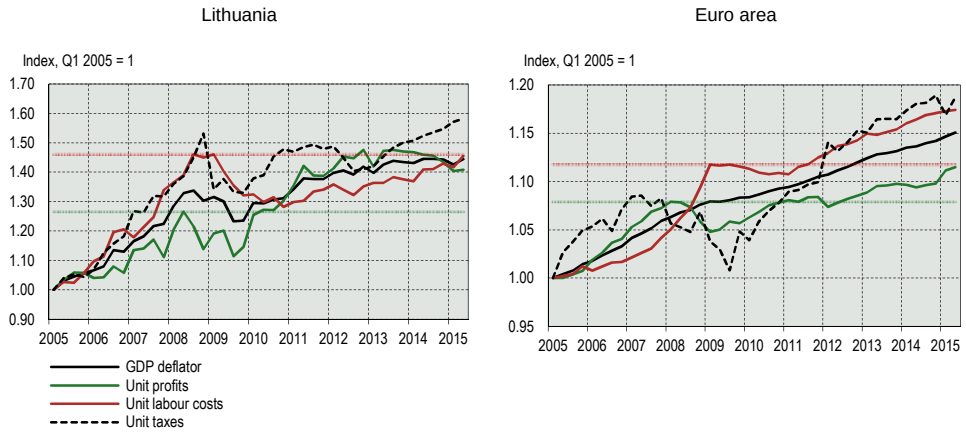
Sources: Statistics Lithuania and Bank of Lithuania calculations

Chart D shows that the services sector, which is the largest economic sector, is the most significant. Still, there were periods, when indicators of other sectors stood out. For example, in 2009, a strong negative contribution on unit profits was exerted by construction — the economic activity that was most heavily affected by the crisis. Meanwhile, a strong positive contribution of unit profits in 2010 and 2011 was mostly related to manufacturing. During that period, competitiveness of Lithuanian exporters improved, imports grew and market shares widened due to wage developments that determined a slow growth of exporters' costs and due to the rise in labour productivity. Thus, manufacturing enterprises had opportunities to boost their profits. The negative contribution of unit profits in 2014 was affected by all sectors, except construction, i.e. agriculture, industry and services. The development of construction in 2013 and 2014 was favourable to the increase of profits by construction enterprises. This activity noticeably contributed to the economic growth, investment in industrial

constructions and warehouses recovered and the residential real estate market became more active.

In addition to the GDP deflator structure and contributions to its growth, the level of unit components is an informative indicator, since it allows observing quarterly trends and establishing which components declined more during the crisis or recovered faster after it. Chart E shows that unit components of the GDP deflator of Lithuania declined fast during the crisis, whereas their changes, especially those of unit labour costs, were more moderate in the euro area.

Chart E. Developments of unit components of the GDP deflator

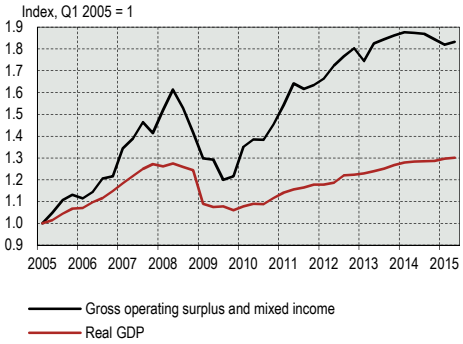


Sources: Eurostat and Bank of Lithuania calculations.
Note: lighter horizontal lines represent the highest level of respective indicators in the period 2005–2009.

Both in Lithuania and in the euro area unit profits, unit labour costs and unit taxes increased after the crisis, albeit at a different rate. In the euro area, all GDP deflator components currently exceed their highest pre-crisis level. The increase in unit labour costs is particularly noticeable; however, unit profits are not much higher than prior to the crisis; moreover, they reached the pre-crisis level quite late — at the beginning of 2011. In Lithuania, the situation is opposite: the recovery in unit labour costs is slower than in unit profits. Unit labour costs still remain (after the increase that lasted more than 4 years) slightly below the highest pre-crisis level. Naturally, that level was one of the signs of the overheating of the economy; therefore, it is unreasonable to expect that Lithuania will exceed it significantly in the near future.

In Lithuania, unit profits reached the pre-crisis level early, i.e. already at the beginning of 2010, and fast — over one quarter. When talking about such fast recovery, we should remember that the unit profit development is related to the differences in the changes of two indicators used in its calculation (gross operating surplus and mixed income as well as real GDP). The indicator of gross operating surplus and mixed income reached the pre-crisis level only in the middle of 2011 (see Chart F), a year later than its ratio to real GDP (unit profits). This ratio reached the former level so fast due to the fact that the indicator of gross operating surplus and mixed income declined much more than real GDP during the crisis; therefore, it grew much faster than real GDP after the crisis (real GDP reached the pre-crisis level only in the middle of 2014).

Chart F. Levels of profit and real GDP



Sources: Eurostat and Bank of Lithuania calculations.

Other profit indicators calculated from national accounts

The discussed unit components of the GDP deflator are closely related to other profit and labour income indicators calculated from national accounts data. When the latter are known, it is also possible to calculate the discussed unit indicators. For example, unit profits may be calculated by multiplying the profit share, compared to nominal GDP, by the GDP deflator:

$$UGOS = GOS/(P \times Y) \times (P \times Y)/Y.$$

Accordingly, it is possible to calculate unit labour costs by using the share of labour income. Labour income and profit shares show the distribution of income to factors of production, i.e. labour and capital.

Profit share is similar to the accounting indicator of profitability of enterprises — the ratio of profit to sales income. Meanwhile, the labour income share has an important purpose when conducting economic research. According to the economic theory, enterprises optimise their activity by setting prices, which correspond to marginal costs increased by a certain value. Marginal costs cannot be observed; however, they may be replaced by economic indicators that have similar meaning. When applying the New Keynesian Phillips curve, unit labour costs are considered to be the estimate of nominal marginal costs, whereas the labour income share is considered to be the estimate of real marginal costs. Although unambiguous results are not obtained, similar trends of the labour income share and inflation may indicate

causality: when the market structure and technology do not change, a large labour income share means lower than acceptable for enterprises profit mark-up and thus induces inflation.

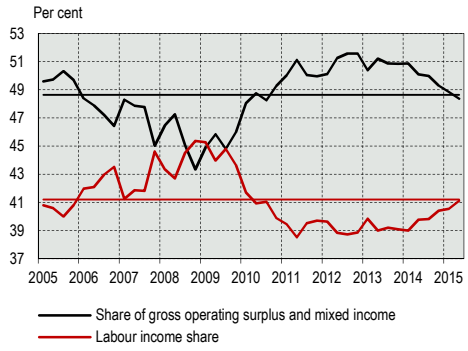
The profit and labour income shares in Lithuania are currently at their long-term average (see Chart G). Both shares approached their averages just recently. In 2011–2013, they were quite stable, although deviated from their averages, whereas from the beginning of 2014, the profit share declined consistently and the labour income share increased. According to the data of the middle of 2015, profit and labour income shares are the same as in the beginning of 2006. The situation is not as tense as it was during the economic upturn, when wages, with a lack in workers, rose substantially faster than nominal GDP and the labour income share was considerably higher than now. The current increase in the labour income share is probably related to improving situation in the labour market and increasing bargaining power of employees: although the unemployment is still substantial, there is a shortage of employees who have suitable qualification and this creates pressure on the wage growth.

Profit mark-up for the total economy could be approximately evaluated calculating the ratio of the GDP deflator to unit labour costs, i.e. the ratio of nominal GDP to compensation of employees. This indicator is opposite to the labour income share. The ratio of nominal GDP to compensation of employees may be explained as the amount of nominal GDP euros per euro paid in the form of compensation. After subtracting 1 from this ratio and calculating it as a percentage, we obtain the percentage that shows the mark-up that enterprises are able to add to marginal costs.

However, usually it is not the profit mark-up that is used for analysis, but its annual change calculated as the difference of annual changes in the GDP deflator and in unit labour costs. Chart H shows the change of profit mark-up and reveals the same trends as Chart B, which reflects the contribution of unit components to the GDP deflator change. Same as with unit profits, the profit mark-up is currently decreasing, which determines the decline in the GDP deflator.

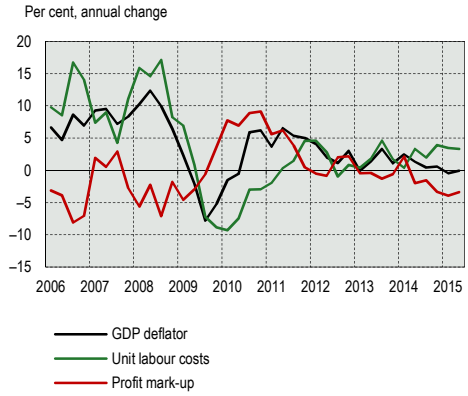
As was mentioned before, the development of profit indicators depends on the capability of enterprises to adjust their production prices in line with the changes of production costs. Sometimes they cannot transfer higher costs to consumers and have to accept those costs themselves; therefore the profit earned by them decreases. The capacity of enterprises to increase production prices is highly dependent on the overall economic situation, for example, on demand trends. The latter are reflected by such indicators as theoutput gap or the production capacity utilisation level. Data for Lithuania also confirms this link. Chart I shows that the trends of profit indicators are quite similar to those of the production capacity utilisation level. The growth of gross operating surplus and mixed income — the indicator that is not calculated as the ratio to GDP — is the most similar to the trends of the capacity utilisation level.

Chart G. Profit and labour income shares compared to nominal GDP



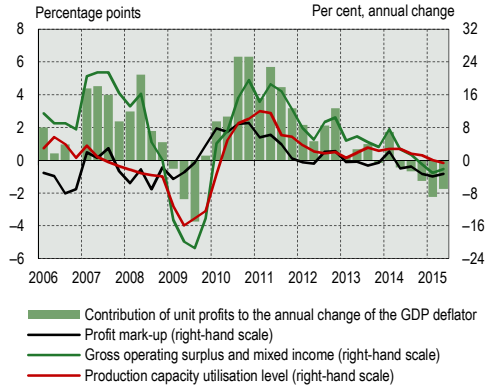
Sources: Eurostat and Bank of Lithuania calculations.
Notes: 1) horizontal lines represent the long-term average of respective indicators; 2) the share of taxes is not shown.

Chart H. Developments of the GDP deflator, unit labour costs and profit mark-up



Sources: Eurostat and Bank of Lithuania calculations.

Chart I. Profit indicators and the developments of production capacity utilisation level



Sources: Eurostat, European Commission and Bank of Lithuania calculations.

Deficiencies of profit indicators calculation from national accounts

The calculation of profit indicators from national accounts has its shortcomings. They are related to the peculiarities of gross operating surplus and mixed income indicator, which is used in the calculations. This indicator is the measure most similar to profit that can be obtained from national accounts; however, it also has important differences.

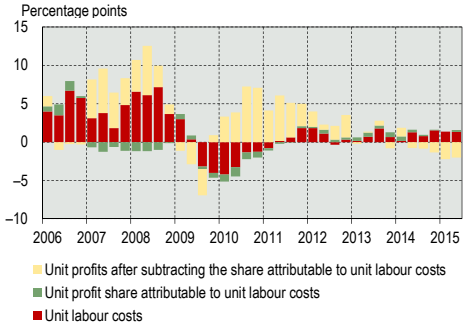
First, gross operating surplus and mixed income cover not only profit, but also certain other income. It is essentially a residual value: it covers everything that is not income of employees and taxes. As we can see from the name of the indicator, it covers not only gross operating surplus,but mixed income as well.[30] The latter is the income that cannot be attributed

[30] For each of these components, annual data is provided; however, quarterly data, which would be most useful for the analysis of the latest trends, is not provided.

to labour or capital only, for example, the income of sole proprietorships and self-employed persons. Data on income of self-employed persons is not published; however, in order to purify the profit indicator, this income may be estimated from the data of compensation of employees and then subtracted from profit and attributed to labour income. When estimating income of self-employed persons, an assumption is made that compensation to one such person is the same as to one employed person. By multiplying this compensation by the number of self-employed persons, the estimate of compensation to the self-employed is obtained. When performing calculations, income of self-employed persons is not included in labour income, since results and conclusions remain substantially unchanged (see Chart J) and uncertainty about approximate size of this income is avoided.

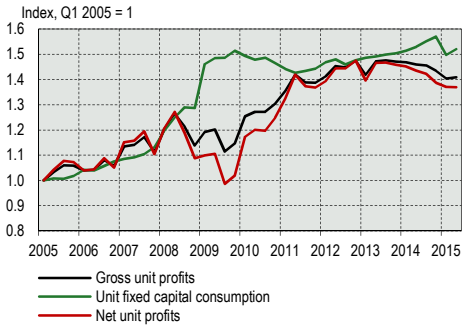
Second, gross operating surplus and mixed income also cover such components that are not covered by the usual concept of profit. For example, fixed capital consumption — the decline in the value of available fixed assets due to wear, ageing or accidental damage — is included. Fixed capital consumption in Lithuania in the period of 2005–2014 comprised on average around one fourth of gross operating surplus and mixed income. It can be subtracted from the overall indicator to obtain the respective net indicator (simply speaking — net profit). By dividing the latter from real GDP, net unit profits are obtained. Their development trend in Lithuania is very similar to that of gross unit profits (see Chart K). Thus, the results of the analysis remained virtually unchanged due to the calculation of net profits, same as due to the inclusion of income of self-employed persons in labour income.

Chart J. Contributions to the change of the GDP deflator in Lithuania, showing the impact of the inclusion of income of self-employed persons in labour income



Sources: Statistics Lithuania and Bank of Lithuania calculations.

Chart K. Unit profits and unit fixed capital consumption



Sources: Statistics Lithuania and Bank of Lithuania calculations.

Conclusions

The influence of domestic factors on prices in Lithuania may be estimated by breaking down the changes of the GDP deflator into contributions of unit components — unit labour costs, unit profits and unit taxes. They fluctuated considerably in the last decade. During the economic upturn, wages and unit labour costs grew very fast due to the labour force shortage. The growth of the GDP deflator in that period was also supported by profits, since favourable conditions for its increase were created by strong domestic demand. During the economic recession, unit labour costs declined substantially due to a considerable decline in wages. In the period from 2011, when the economic growth became more sustainable, prices grew slower than before the crisis, since the positive contribution of both unit labour costs and unit profits declined.

The trend of unit profits changed from 2014 — they are declining and their contribution to the GDP deflator growth is negative. Thus, profits perform a role of a buffer, i.e. they slow down the price growth. Enterprises have to accept lower profits as labour costs are increasing and in the environment of low inflation there are not many possibilities for raising prices. The growth of the labour costs is currently determined by such factors as the shortage of the labour force of suitable qualification and the minimum wage increase. Nevertheless, even now, after the long-lasting increase, unit labour costs remain slightly below the highest pre-crisis level.

Other indicators that are calculated from national accounts — profit mark-up, profit and labour income shares — show similar trends as unit components of the GDP deflator. For example, same as unit profits, the profit mark-up is currently decreasing, which determines the decline in the GDP deflator. The labour income and profit shares that reflect income distribution to factors of production are currently close to their long-term averages. However, the profit share has been declining recently, whereas the labour income share has been growing. The latter share remains considerably lower than during the economic boom, when wages grew much faster than nominal GDP. However, its increase shows that the bargaining power of employees increases: although the unemployment is still substantial, there is a shortage of the labour force with suitable qualification and this creates pressure on the wage growth.